

Course Schedule - Fall 2005

Civil and Environmental Engineering

195 **About Civil Engineering** Credit: 0 hours.

(CEE 195) Civil engineering orientation course including historical developments, education requirements, relation to science, professional practice, and specialties within the profession. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
29692	discussion-recitation	H	04:00 PM - 04:50 PM	W	room 100 Materials Science and Eng Bld	Lange, D

199 **Undergraduate Open Seminar** Credit: 1 to 5 hours.

(CEE 199) May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
40943	lecture-discussion	EH	03:00 PM - 04:50 PM	R	room 203 Transportation Bldg	Herricks, E
40943: Discovery course.						
40943: 2 hours Topic: First Year Discovery Program Course. Registration restricted to freshmen. Students should enroll in only one Discovery course. Students who enroll in more than one Discovery course may be dropped from the additional Discovery courses. For course descriptions, see the Discovery Program booklet.						

201 **Systems Engrg & Economics** Credit: 3 hours.

(CEE 292) Introduction to the formulation and solution of civil engineering problems. Major topics are: engineering economy, mathematical modeling, and optimization. Techniques, including classical optimization, linear and nonlinear programming, network theory, critical path methods, simulation, decision theory, and dynamic programming are applied to a variety of civil engineering problems. Prerequisite: MATH 230; credit or concurrent registration in MATH 225

CRN	Type	Section	Time	Days	Location	Instructor
29694	lecture-discussion	NP	10:00 AM - 11:20 AM	TR	room 112 Transportation Bldg	Lange, D

202 **Engineering Risk & Uncertainty** Credit: 3 hours.

(CEE 293) Identification and modeling of non-deterministic problems in civil engineering design and decision making. Development of stochastic concepts and simulation models, and their relevance to real design and decision problems in various areas of civil engineering Prerequisite: credit or concurrent registration in MATH 242 recommended

CRN	Type	Section	Time	Days	Location	Instructor
29696	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 112 Transportation Bldg	Song, J

300 Behavior of Materials Credit: 4 hours.
(CEE 210) Same as TAM 324. See TAM 324.

This course satisfies the General Education Criteria for a Advanced Composition course.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
33358	laboratory	AB1	03:00 PM - 04:50 PM	M	room 1225 Newmark Civil Engineering Bldg	Zuniga Zamalloa, C
33358: Advanced Composition course.						
33309	laboratory	AB2	10:00 AM - 11:50 AM	T	room 1225 Newmark Civil Engineering Bldg	Phillips, J
33309: Advanced Composition course.						
33325	laboratory	AB3	01:00 PM - 02:50 PM	T	room 1225 Newmark Civil Engineering Bldg	Lakarosky, J
33325: Advanced Composition course.						
33337	laboratory	AB4	03:00 PM - 04:50 PM	W	room 1225 Newmark Civil Engineering Bldg	Zuniga Zamalloa, C
33337: Advanced Composition course.						
33354	laboratory	AB5	10:00 AM - 11:50 AM	R	room 1225 Newmark Civil Engineering Bldg	Lakarosky, J
33354: Advanced Composition course.						
34959	lecture	AL1	01:00 PM - 01:50 PM	MWF	room 103 Talbot Laboratory	Phillips, J; Struble, L
34959: Advanced Composition course.						

310 Transportation Engineering Credit: 3 hours.

(CEE 220) An introduction to the design, planning, operation, management, and maintenance of transportation systems; integrated multi-modal transportation systems (highways, air, rail, etc.); layout of highways, airports, and railroads with traffic flow models, capacity analysis, and safety. Design of facilities and systems with life cycle costing procedures and criteria for optimization Prerequisite: TAM 251; credit or concurrent registration in CEE 202.

CRN	Type	Section	Time	Days	Location	Instructor
29699	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Tutumluer, E; Ouyang, Y

320 Construction Engineering Credit: 3 hours.

(CEE 216) Introduction to the construction processes: contracting and bonding, planning and scheduling, estimating and project control, productivity models, and construction econometrics. Prerequisite: CEE 201; credit or concurrent registration in CS 101 and CEE 202.

CRN	Type	Section	Time	Days	Location	Instructor
29701	lecture	TW	03:00 PM - 04:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Pena-Mora, F

330 Environmental Engineering Credit: 3 hours.

(CEE 241) Considers the sources, characteristics, transport, and effects of air and water contaminants; biological, chemical, and physical processes in water; atmospheric structure and composition; unit operations for air and water quality control; solid waste management; and environmental quality standards. Prerequisite: CHEM 104.

CRN	Type	Section	Time	Days	Location	Instructor
29702	lecture-discussion	RS	01:30 PM - 02:50 PM	TR	room 1518 Civil Eng Hydrosystems Lab	Morgenroth, E

350 Water Resources Engineering Credit: 3 hours.

(CEE 255) Quantitative aspects of water in the earth's environment and its engineering implications, including design and analysis of systems directly concerned with use and control of water; quantitative introduction to hydrology, hydraulic engineering, and water resources planning Prerequisite: CEE 202; credit or concurrent registration in TAM 335 and CEE 201.

CRN	Type	Section	Time	Days	Location	Instructor
29704	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Schmidt, A

360 Structural Engineering Credit: 3 hours.

(CEE 261) Basic topics in the analysis, behavior and design of trusses and framed structures under static loads; analysis topics include member forces in trusses, shear and moment diagrams, deflections, simple applications of the force method and slope-deflection; introduction to computer applications. Prerequisite: TAM 251.

CRN	Type	Section	Time	Days	Location	Instructor
29706	lecture-discussion	G	03:00 PM - 03:50 PM	MWF	room 119 Materials Science and Eng Bld	Dodds, R

380 Geotechnical Engineering Credit: 3 hours.

(CEE 280) Introduction to geotechnical engineering. Classification of soils, compaction in the laboratory and in the field, soil exploration, boring and sampling, permeability of soils, one-dimensional settlement analyses, strength of soil, introduction to foundations. Prerequisite: TAM 251

CRN	Type	Section	Time	Days	Location	Instructor
42446	lecture-discussion	BB	09:00 AM - 09:50 AM	MWF	room 1233 Newmark Civil Engineering Bldg	Hashash, Y
29708	lecture-discussion	RS	01:30 PM - 02:50 PM	TR	room 1214 Siebel Center for Comp Sci	Stark, T

401 Concrete Materials Credit: 3 hours.

(CEE 314) Examines the influence of constituent materials (cements, aggregates and admixtures) on the properties of fresh and hardened concrete; mix design handling and placement of concrete; and behavior of concrete under various types of loading and environment; test methods. Laboratory practice is an integral part of the course. Prerequisite: CEE 300.

CRN	Type	Section	Time	Days	Location	Instructor
29713	laboratory	AB1	01:00 PM - 02:50 PM	R	room 1225 Newmark Civil Engineering Bldg	Roesler, J
29721	lecture	AL1	09:00 AM - 09:50 AM	MW	room 1225 Newmark Civil Engineering Bldg	Roesler, J

405 Asphalt Materials, I Credit: 3 or 4 hours.

(CEE 321) Properties and control testing of bituminous materials, aggregates for bituminous mixtures, and analysis and design of asphalt concrete and liquid asphalt cold mixtures; structural properties of bituminous mixes; surface treatment design; and recycling of mixtures. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor
31541	laboratory	3A	09:00 AM - 10:50 AM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	3A	10:00 AM - 10:50	MW	room 1233	Buttler, W

			AM		Newmark Civil Engineering Bldg	
: 3 hours						
41753	laboratory	3B	11:00 AM - 12:50 PM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	3B	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttler, W
: 3 hours						
31543	laboratory	4A	11:00 AM - 12:50 PM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	4A	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttler, W
: 4 hours This section is reserved for graduate students only.						
41752	laboratory	4B	09:00 AM - 10:50 AM	F	room 1225 Newmark Civil Engineering Bldg	
	lecture	4B	10:00 AM - 10:50 AM	MW	room 1233 Newmark Civil Engineering Bldg	Buttler, W
: 4 hours This section is reserved for graduate students only.						

406 Pavement Design, I Credit: 3 or 4 hours.

(CEE 320) Analysis, behavior, performance, and structural design of pavements for highways and airfields; topics include climate factors, rehabilitation, life cycle design economics, and traffic loadings. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor
29731	lecture-discussion	3	08:00 AM - 08:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Roesler, J
29731: 3 hours						
40934	lecture-discussion	4	08:00 AM - 08:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Roesler, J
40934: 4 hours This section is reserved for graduate students only.						

416 Traffic Capacity Analysis Credit: 3 or 4 hours.

(CEE 325) Study of fundamentals of traffic engineering; analysis of traffic stream characteristics; capacity of urban and rural highways; design and analysis of traffic signals and intersections; traffic control; traffic impact studies; and traffic accidents 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 310.

CRN	Type	Section	Time	Days	Location	Instructor
29733	lecture-discussion	3	09:00 AM - 09:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Benekohal, R
29733: 3 hours						
40935	lecture-discussion	4	09:00 AM - 09:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Benekohal, R
40935: 4 hours This section is reserved for graduate students only.						

420 Construction Productivity Credit: 3 or 4 hours.

(CEE 315) Introduction of the application of scientific principles to the measurement and forecasting of productivity in construction engineering. Conceptual and mathematical formulation of labor, equipment, and material factors affecting productivity 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 320.

CRN	Type	Section	Time	Days	Location	Instructor
29736	lecture-discussion	3	03:00 PM - 04:20 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
29736: 3 hours						
40936	lecture-discussion	4	03:00 PM - 04:20 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
40936: 4 hours This section is reserved for graduate students only.						

421 Construction Planning Credit: 3 or 4 hours.

(CEE 316) Project definition; scheduling and control models; material, labor and equipment allocation; optimal schedules; project organization; documentation and reporting systems; and management and control 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 320.

CRN	Type	Section	Time	Days	Location	Instructor
29738	lecture-discussion	3	08:00 AM - 09:20 AM	TR	room 1233 Newmark Civil Engineering Bldg	El-Rayes, K
29738: 3 hours						
40937	lecture-discussion	4	08:00 AM - 09:20 AM	TR	room 1233 Newmark Civil	El-Rayes, K

					Engineering Bldg	
40937: 4 hours This section is reserved for graduate students only.						

422 Construction Cost Analysis Credit: 3 or 4 hours.

(CEE 318) Introduction to the application of scientific principles to costs and estimates of costs in construction engineering; concepts and statistical measurements of the factors involved in direct costs, general overhead costs, cost markups and profits; and the fundamentals of cost recording for construction cost accounts and cost controls 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 320.

CRN	Type	Section	Time	Days	Location	Instructor
29740	lecture-discussion	3	01:30 PM - 02:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Boukamp, F
29740: 3 hours						
40938	lecture-discussion	4	01:30 PM - 02:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Boukamp, F
40938: 4 hours This section is reserved for graduate students only.						

430 Ecological Quality Engineering Credit: 2 hours.

(CEE 337) Examines the characteristics of rivers and lakes which affect the management of domestic and industrial wastewaters; includes assessment of chemical hazards, and introduction to surveillance and biomonitoring, and a review of regulations governing effluents. Prerequisite: CEE 330.

CRN	Type	Section	Time	Days	Location	Instructor
29742	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 106B6 Engineering Hall	Herricks, E

434 Environmental Systems, I Credit: 3 hours.

(CEE 339) Introduction to the concepts and applications of environmental systems analysis. Application of mathematical programming and modeling to the design, planning and management of engineered environmental systems, regional environmental systems, and environmental policy. Economic analysis, including benefit-cost analysis and management strategies. Concepts of tradeoff, non-inferior sets, single and multi-objective optimization. Practical application to case studies to convey an understanding of the complexity and data collection challenges of actual design practice. Prerequisite: CEE 201 or GE 330; CEE 330.

CRN	Type	Section	Time	Days	Location	Instructor
29744	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room 1302 Siebel Center for Comp Sci	Eheart, J

437 Water Quality Engineering Credit: 3 hours.

(CEE 342) Fundamental theory underlying the unit processes utilized in the treatment of water for domestic and industrial usage, and in the treatment of domestic and industrial wastewaters. Prerequisite: CEE 330; credit or concurrent registration in TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
29749	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Snoeyink, V

442 Env Eng Principles, Physical Credit: 3 hours.

(CEE 340) Analysis of the physical principles which form the basis of many water and air quality-control operations; sedimentation, filtration, inertial separations, flocculation, mixing and principles of reactor design. Prerequisite: CEE 437.

CRN	Type	Section	Time	Days	Location	Instructor
29746	lecture-discussion	B	09:00 AM - 09:50 AM	MWF	room 112 Transportation Bldg	Clark, M

443 Env Eng Principles, Chemical Credit: 4 hours.

(CEE 343) Application of principles of chemical equilibrium and chemical kinetics to air and water quality. Chemistry topics are thermodynamics, kinetics, acid/base chemistry, complexation, precipitation, dissolution, and oxidation/reduction. Many applications are also presented. Prerequisite: CEE 437.

CRN	Type	Section	Time	Days	Location	Instructor
29750	lecture-discussion	NP	10:00 AM - 11:50 AM	TR	room 1233 Newmark Civil Engineering Bldg	Strathmann, T

446 Air Quality Engineering Credit: 3 hours.

(CEE 349) Description and application of chemical and physical principles related to air pollutants, aerosol mechanics, attenuation of light in the atmosphere, air quality regulation, generation of air pollutants, methods to remove gaseous and particulate pollutants from gas streams, and atmospheric dispersion. Prerequisite: CEE 330; credit or concurrent registration in TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
29752	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 112 Transportation Bldg	Rood, M

450 Surface Hydrology Credit: 3 hours.

(CEE 350) Study of descriptive and quantitative hydrology dealing with the distribution, circulation, and storage of water on the earth's surface; discusses principles of hydrologic processes and presents methods of analysis and their applications to engineering and environmental problems. Prerequisite: CEE 350.

CRN	Type	Section	Time	Days	Location	Instructor
29758	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room 112 Transportation Bldg	Cai, X

451 Environmental Fluid Mechanics Credit: 3 hours.

(CEE 351) Incompressible fluid mechanics with particular emphasis on topics in analysis and applications in civil engineering areas; primary topics include principles of continuity, momentum and energy, kinematics of flow and stream functions, potential flow, laminar motion, turbulence, and boundary-layer theory. Prerequisite: TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
29761	lecture-discussion	G	03:00 PM - 03:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Parker, G

457 Groundwater Credit: 3 hours.

Physical properties of groundwater and aquifers, principles and fundamental equations of porous media flow and mass transport, well hydraulics and pumping test analysis, role of groundwater in the hydrologic cycle, groundwater quality and contamination. Prerequisite: CEE 350 and TAM 335.

CRN	Type	Section	Time	Days	Location	Instructor
43780	lecture-discussion	RS	01:30 PM - 02:50 PM	TR	room 1131 Siebel Center for Comp Sci	Valocchi, A

460 Steel Structures, I Credit: 3 hours.

(CEE 263) Introduction to the design of metal structures; behavior of members and their connections; and theoretical, experimental, and practical bases for proportioning members and their connections 3 undergraduate hours. No graduate credit. Prerequisite: CEE 360

CRN	Type	Section	Time	Days	Location	Instructor
29767	lecture-discussion	LM	08:00 AM - 09:50 AM	TR	room 1518 Civil Eng Hydrosystems Lab	Bignell, J

461 Reinforced Concrete, I Credit: 3 hours.

(CEE 264) Study of the strength, behavior, and design of reinforced concrete members subjected to moments, shear, and axial forces; extensive discussion of the influence of the material properties on behavior 3 undergraduate hours. No graduate credit. Prerequisite: CEE 360

CRN	Type	Section	Time	Days	Location	Instructor
29770	lecture-discussion	NP	10:00 AM - 11:50 AM	TR	room 1518 Civil Eng Hydrosystems Lab	Abrams, D

462 Steel Structures, II Credit: 3 or 4 hours.

(CEE 363) Metal members under combined loads; connections, welded and bolted; moment-resistant connections; plate girders, conventional behavior, and tension field action. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 460.

CRN	Type	Section	Time	Days	Location	Instructor
29772	lecture-discussion	3	03:00 PM - 03:50 PM	MWF	room 112 Transportation Bldg	Walker, W
29772: 3 hours						
40939	lecture-discussion	4	03:00 PM - 03:50 PM	MWF	room 112 Transportation Bldg	Walker, W
40939: 4 hours This section is reserved for graduate students only.						

465 Design of Structural Systems Credit: 3 or 4 hours.

(CEE 365) The whole structural design process including definition of functional requirements, selection of structural scheme, formulation of design criteria, preliminary and computer-aided proportioning, and analysis of response, cost, and value. 3 undergraduate hours. 4 graduate hours. Prerequisite: Credit in either CEE 460 or CEE 461 with concurrent registration in the other.

CRN	Type	Section	Time	Days	Location	Instructor
29775	lecture-discussion	C	10:00 AM - 10:50 AM	MWF	room B218 Newmark Civil Engineering Bldg	Gavlin, N
29775: 3 hours This section is reserved for undergraduate students only.						

468 Prestressed Concrete Credit: 3 or 4 hours.

(CEE 368) Study of strength, behavior, and design of prestressed reinforced concrete members and structures, with primary emphasis on pretensioned, precast construction; emphasis on the necessary coordination between design and construction techniques in prestressing. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CEE 461.

CRN	Type	Section	Time	Days	Location	Instructor
45939	lecture-discussion	LM3	08:00 AM - 09:50 AM	TR	room 1105 Siebel Center for Comp Sci	Gurfinkel, G
45939: 3 hours						
45940	lecture-discussion	LM4	08:00 AM - 09:50 AM	TR	room 1105 Siebel Center for Comp Sci	Gurfinkel, G
45940: 4 hours						

470 Structural Analysis Credit: 4 hours.

(CEE 361) Direct stiffness method of structural analysis; fundamentals and algorithms; numerical analysis of plane trusses, grids and frames; virtual work and energy principles; introduction to the finite element method for plane stress and plane strain. Prerequisite: CEE 360.

CRN	Type	Section	Time	Days	Location	Instructor
29778	lecture-discussion	RS	01:00 PM - 02:50 PM	TR	room 112 Transportation Bldg	Duarte, C

471 Structural Mechanics Credit: 3 or 4 hours.

(CEE 379) Beams under lateral load and thrust; beams on elastic foundations; virtual work and energy principles; principles of solid mechanics, stress and strain in three dimensions; static stability theory; torsion; computational methods. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: MATH 385 and TAM 251.

CRN	Type	Section	Time	Days	Location	Instructor
29780	lecture-discussion	3	10:00 AM - 10:50 AM	MWF	room 112 Transportation Bldg	Hjelmstad, K
29780: 3 hours						
40940	lecture-discussion	4	10:00 AM - 10:50 AM	MWF	room 112 Transportation Bldg	Hjelmstad, K
40940: 4 hours This section is reserved for graduate students only.						

480 Foundation Engineering Credit: 3 hours.

(CEE 284) Analysis and design of foundations, bearing capacity and settlement of foundations; stability of excavations and slopes; ground movements due to construction; analysis and design of excavations, retaining walls, slopes and underground structures in soil and rock. 3 undergraduate hours. No graduate credit. Prerequisite: CEE 380.

CRN	Type	Section	Time	Days	Location	Instructor
29784	lecture-discussion	TW	03:00 PM - 04:20 PM	TR	room 112 Transportation Bldg	Long, J

483 *Soil Mechanics and Behavior* Credit: 4 hours.

(CEE 383) Composition and structure of soil; water flow and hydraulic properties; stress in soil; compressibility behavior and properties of soils; consolidation and settlement analysis; shear strength of soils; compaction and unsaturated soils; experimental measurements. Prerequisite: CEE 380.

CRN	Type	Section	Time	Days	Location	Instructor
31545	laboratory	AB1	01:00 PM - 02:50 PM	T	room B218 Newmark Civil Engineering Bldg	Mesri, G
31546	laboratory	AB2	10:00 AM - 11:50 AM	R	room B218 Newmark Civil Engineering Bldg	Mesri, G
31547	lecture	AL1	01:00 PM - 01:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Mesri, G

484 *Applied Soil Mechanics* Credit: 4 hours.

(CEE 384) Application of soil mechanics to earth pressures and retaining walls, stability of slopes, foundations for structures, excavations; construction considerations; instrumentation. Prerequisite: CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
29790	lecture-discussion	F	02:00 PM - 02:50 PM	MWF	room B218 Newmark Civil Engineering Bldg	Lenzini, P

495 *Professional Practice* Credit: 0 hours.

(CEE 295) Series of lectures by outstanding authorities on the practice of civil engineering and its relations to economics, sociology, and other fields of human endeavor. 0 undergraduate hours. No graduate credit. Approved for S/U grading only. Prerequisite: Junior standing

CRN	Type	Section	Time	Days	Location	Instructor
29793	lecture	H	04:00 PM - 04:50 PM	W	room 151 Everitt Elec and Comp Engr Lab	Valocchi, A; Dodds, R

497 *Independent Study* Credit: 0 to 16 hours.

(CEE 397) Individual investigations or studies of any phase of civil engineering selected by the student and

approved by the department 1 to 4 undergraduate hours. 0 to 16 graduate hours. Prerequisite: Senior or graduate standing; consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10474	independent study		ARRANGED			
10474: Instructor Approval Required						

498 *Special Topics* Credit: 1 to 4 hours.

(CEE 398) Structured presentations of new and developing areas of knowledge in civil engineering offered by the faculty to augment the formal courses available. Prerequisite: Individually identified for each offering under this course number; see Schedule.

CRN	Type	Section	Time	Days	Location	Instructor
44194	laboratory-discussion	BP	01:00 PM - 01:50 PM	M	room B222 Newmark Civil Engineering Bldg	Finneran, K
	laboratory-discussion	BP	01:30 PM - 04:20 PM	W	room B222 Newmark Civil Engineering Bldg	Finneran, K
: 3 hoursSECTION BP: BIOLOGICAL PRINCIPLES LABORATORY. PREREQ: MCB 300 (OR EQUIVALENT) AND CHEM 104 (OR EQUIVALENT) OR CEE 444.						
31548	lecture-discussion	PP	09:00 AM - 09:50 AM	MWF	room 1111 Siebel Center for Comp Sci	Carpenter, S
31548: 3 hoursTOPIC: PAVEMENT PRESERVATION. PREREQUISITE: CEE 310.						
31549	lecture-discussion	RT3	03:00 PM - 03:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Barkan, C
31549: 3 hoursSECTION RT3: RAILWAY TRANSPORTATION OPERATING EFFICIENCY. PREREQ: CEE 310 OR CONSENT OF INSTRUCTOR.						
41720	lecture-discussion	RT4	03:00 PM - 03:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Barkan, C
41720: 4 hoursSECTION RT4: RAILWAY TRANSPORTATION OPERATING EFFICIENCY. PREREQ: CEE 310 OR CONSENT OF INSTRUCTOR. 4 HOURS GRADUATE CREDIT.						
31550	lecture-discussion	SH	03:00 PM - 03:50 PM	F	room 1225 Newmark Civil Engineering Bldg	Struble, L
31550: 1 hoursSECTION SH: SUSTAINABLE HOUSING. PREREQ: CEE OR ARCH STUDENT.						

500 Advanced Topics in Materials Credit: 1 to 4 hours.

(CEE 410) Lectures and discussions related to advanced topics in the science and technology of materials used in civil engineering construction. May be repeated in the same or separate terms to a maximum of 16 graduate hours. Prerequisite: As specified for each section; see Schedule.

CRN	Type	Section	Time	Days	Location	Instructor
43784	lecture-discussion	NDT	10:00 AM - 11:50 AM	M	room 1225 Newmark Civil Engineering Bldg	Popovics, J
	lecture-discussion	NDT	01:00 PM - 01:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Popovics, J
: 4 hours						

508 Pavement Evaluation and Rehab Credit: 4 hours.

(CEE 421) Concepts and procedures for condition survey rating; evaluation by nondestructive testing (roughness, skid resistance, structural capacity); and destructive testing, maintenance strategies, and rehabilitation of pavement systems for highways and airfields. Prerequisite: CEE 406.

CRN	Type	Section	Time	Days	Location	Instructor
29801	lecture-discussion	X	12:00 PM - 12:50 PM	MWF	room 1233 Newmark Civil Engineering Bldg	Al-Qadi, I

509 Transportation Soils Credit: 4 hours.

(CEE 424) Occurrence and properties of surficial soils, soil classification systems, soil variability; subgrade evaluation procedures, repeated loading behavior of soils; soil compaction and field control; soil moisture, soil temperature, and frost action; soil trafficability and subgrade stability for transportation facility engineering. Prerequisite: CEE 483.

CRN	Type	Section	Time	Days	Location	Instructor
29804	lecture-discussion	LM	08:30 AM - 09:50 AM	TR	room 1225 Newmark Civil Engineering Bldg	Tutumluer, E

537 Water Quality Control Proc, I Credit: 4 hours.

(CEE 440) Theory and basic design of processes used in water and wastewater treatment, including adsorption, ion exchange, chemical oxidation and reduction, disinfection, sedimentation, filtration, coagulation, flocculation, and chemical precipitation. Prerequisite: Credit or concurrent registration in CEE 442 and CEE 443.

CRN	Type	Section	Time	Days	Location	Instructor
29807	lecture	LM	08:00 AM - 09:50 AM	TR	room B218	Marinas, B

			AM		Newmark Civil Engineering Bldg	
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540 Remediation Design Credit: 4 hours.

(CEE 445) Evaluation and design of alternative treatment processes for hazardous waste sites contaminated with organic and/or metal wastes. Group design project due at the end of the term. Prerequisite: CEE 440.

CRN	Type	Section	Time	Days	Location	Instructor
29811	lecture-discussion	A	08:00 AM - 08:50 AM	MWF	room 112 Transportation Bldg	Werth, C

545 Aerosol Sampling and Analysis Credit: 4 hours.

(CEE 449) Studies principles of sampling for particles and gases in the field of air pollution; examines instrumental techniques relevant to the design of sampling systems used in process control, ambient air monitoring and laboratory experiments; methods of sample analysis and their limitations. Same as ATMS 535, ENVS 545, and ME 516. Prerequisite: MATH 385 and CEE 446.

CRN	Type	Section	Time	Days	Location	Instructor
36025	laboratory-discussion	TW	03:00 PM - 04:50 PM	TR	room B222 Newmark Civil Engineering Bldg	Bond, T

551 Open-Channel Hydraulics Credit: 4 hours.

(CEE 451) Advanced hydraulics of free surface flow in rivers and open channels; discussion of theory, analytical and numerical solution techniques, and their applications to gradually and rapidly varied nonuniform flows, unsteady flow, and flow in open-channel networks. Prerequisite: CEE 451.

CRN	Type	Section	Time	Days	Location	Instructor
43785	lecture-discussion	E	01:00 PM - 01:50 PM	MWF	room 1518 Civil Eng Hydrosystems Lab	Garcia, M

560 Steel Structures, III Credit: 4 hours.

(CEE 465) Theories of ultimate behavior of metal structural members with emphasis on buckling and stability of members and frames; theory of torsion applied to beam torsion, lateral-torsional buckling, curved beams with emphasis on design criteria; post-buckling strength of plates and post-buckling versus column behavior. Prerequisite: CEE 462.

CRN	Type	Section	Time	Days	Location	Instructor
29813	lecture-	A	08:00 AM - 08:50	MWF	room 1233	Lafave, J.

	discussion		AM		Newmark Civil Engineering Bldg	
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561 Reinforced Concrete, III Credit: 4 hours.

(CEE 466) In-depth study of the behavior of reinforced concrete members, including the relationships between behavior and building code requirements. Prerequisite: CEE 463.

CRN	Type	Section	Time	Days	Location	Instructor
39917	lecture-discussion	D	11:00 AM - 11:50 AM	MWF	room 1233 Newmark Civil Engineering Bldg	Kuchma, D

572 Earthquake Engineering Credit: 4 hours.

(CEE 479) Study of the effects of earthquakes on constructed works and of the design of structures to resist earthquake motions; earthquake ground motions and mechanisms; response of structures to earthquake motion; behavior of materials, elements, assemblages and structures subjected to earthquake motion; principles of earthquake resistant design; and special topics. Prerequisite: CEE 472

CRN	Type	Section	Time	Days	Location	Instructor
29674	lecture-discussion	B	09:00 AM - 09:50 AM	MWF	room 1518 Civil Eng Hydrosystems Lab	Elnashai, A

575 Fracture and Fatigue Credit: 4 hours.

(CEE 475) Fatigue and fracture behavior of steel structures and connections; fatigue and fracture mechanics theory and experimental data; assessment of behavior and current design specification practice. Prerequisite: CEE 462.

CRN	Type	Section	Time	Days	Location	Instructor
29840	lecture-discussion	D	11:30 AM - 12:50 PM	TR	room 106B3 Engineering Hall	Lambros, J; Geubelle, P
29840: MEETS WITH AE 598 FM AND ME 598 DHA.						

585 Deep Foundations Credit: 4 hours.

(CEE 485) Ultimate capacities and load-deflection of piles and drilled shafts subjected to compressive loads, tensile loads, and lateral loads; effects of duration of load, soil-structure interaction; two and three dimensional analysis of pile groups with closely spaced piles; effects of installation; inspection of deep foundations and full-scale field tests. Prerequisite: CEE 484.

CRN	Type	Section	Time	Days	Location	Instructor
29683	lecture-	NP	10:00 AM - 11:20	TR	room B222	Long, J

	discussion		AM		Newmark Civil Engineering Bldg	
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586 Rock Mechanics and Behavior Credit: 4 hours.

(CEE 486) Physical properties and classification of intact rock, theories of rock failure, state of stress in the earth's crust, stresses and deformations around underground openings assuming elastic, plastic, and time-dependent behavior; effect of geologic discontinuities on rock strength; and introduction to stability analyses in rock.

Prerequisite: CEE 483, GEOL 550, and TAM 451.

CRN	Type	Section	Time	Days	Location	Instructor
29687	lecture-discussion	RS	01:00 PM - 02:50 PM	TR	room B222 Newmark Civil Engineering Bldg	Fernandez-Delgado, G

595 Seminar Credit: 0 to 1 hours.

(CEE 495) Discussion of current topics in civil and environmental engineering and related fields by staff, students, and visiting lecturers. Approved for S/U grading only. May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
36094	lecture-discussion	AG	12:00 PM - 12:50 PM	R	room 1518 Civil Eng Hydrosystems Lab	Morgenroth, E
36094: Topic: Advanced Environmental Engineering. Environmental Ph.D. students and second year M.S. students must enroll in CEE 595 AG each semester.						
36095	lecture-discussion	CM	12:00 PM - 12:50 PM	R	room 1233 Newmark Civil Engineering Bldg	Liu, L
36095: Topic: Construction Management.						
36096	lecture-discussion	F	ARRANGED			Mesri, G
36096: Topic: Soil and Rock Mechanics.						
36097	lecture-discussion	G	04:00 PM - 04:50 PM	M	room 1518 Civil Eng Hydrosystems Lab	Strathmann, T
36097: Topic: Environmental Engineering. Environmental first year M.S. students must enroll in CEE 595 G each semester.						
36098	lecture-discussion	S	04:00 PM - 05:20 PM	M	room 151 Loomis Laboratory	Paulino, G
36098: Topic: Structures. All Structures graduate students are required to register for CEE 595 S each semester.						
36099	lecture-	W	04:00 PM - 05:20	W	room 1518 Civil	Garcia, M

	discussion		PM		Eng Hydrosystems Lab	
36099: Topic: Hydraulics and Water Resources.						

597 Independent Study Credit: 0 to 16 hours.

(CEE 497) Individual investigations or studies of any phase of civil engineering selected by the student and approved by the adviser and the staff member who will supervise the investigation. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10476	independent study		ARRANGED			
10476: Instructor Approval Required						

598 Special Topics Credit: 1 to 4 hours.

(CEE 498) Structured presentations of new and developing areas of knowledge in civil engineering at an advanced graduate level. Prerequisite: Individually identified for each offering under this course number; see Schedule.

CRN	Type	Section	Time	Days	Location	Instructor
39920	lecture-discussion	AD	03:00 PM - 04:20 PM	TR	room B218 Newmark Civil Engineering Bldg	Spencer, B
39920: 4 hoursSECTION AD: ADVANCED STRUCTURAL DYNAMICS. PREREQ: CEE 472.						
45663	lecture-discussion	CEL	08:30 AM - 09:50 AM	TR	room 204 Transportation Bldg	Stark, T
45663: 4 hoursSECTION CEL: CONSTRUCTION AND ENGINEERING LAW. PREREQ: CEE 320, CEE 420, CEE 421, CEE 422, OR CONSENT OF INSTRUCTOR. 4 HOURS.						
43789	lecture-discussion	CS	04:30 PM - 05:50 PM	TR	room 1233 Newmark Civil Engineering Bldg	Liu, L
43789: 4 hoursSECTION CS: CONSTRUCTION CASE STUDIES. PREREQ: CEE 420, CEE 421, AND CEE 422.						
45344	lecture-discussion	GT	03:00 PM - 04:20 PM	TR	room 1131 Siebel Center for Comp Sci	Olson, S
45344: 4 hoursSECTION GT: IN SITU TESTING AND FIELD INSTRUMENTATION. PREREQ: CEE 483 AND CEE 484.						
31554	lecture-discussion	SE	ARRANGED			Herricks, E

31554: 4 hours SECTION SE: BIOLOGY OF STRESSED ECOSYSTEMS. PREREQ: CEE 432.

43792	lecture-discussion	SH	08:30 AM - 09:50 AM	TR	room 1131 Siebel Center for Comp Sci	Kumar, P
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43792: 4 hours SECTION SH: STOCHASTIC HYDROLOGY. PREREQ: CEE 550 OR CONSENT OF INSTRUCTOR.

599 **Thesis Research** Credit: 0 to 16 hours.
 (CEE 499) May be repeated. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
10478	independent study		ARRANGED			
10478: Instructor Approval Required						